National Institute of Environmental Health Sciences

A spatial model of shared risk for plague and hantavirus pulmonary syndrome in the southwestern United States

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Abstract:

Plague and hantavirus pulmonary syndrome (HPS) are severe, often fatal diseases in humans that share a broad epidemiologic focus in the southwestern United States. Prevention of these diseases relies heavily on education and reducing rodent abundance in peridomestic environments. Resources for these activities are limited. Therefore, identifying areas sharing elevated risk for these two relatively rare but severe diseases could be useful for targeting limited public health resources. Using logistic regression and geographic information system–based modeling, we identified environmental predictors of elevated risk for plague (distance to piñon-juniper ecotones and amount of precipitation) and HPS (elevation and amount of precipitation) in northeastern Arizona and northwestern New Mexico. Our models accurately identified case locations as suitable (producer accuracies of 93% for plague and 96% for HPS) and indicated that approximately half of the coverage area was classified as suitable risk for either plague or HPS. The probability of a site being classified as suitable for plague was strongly correlated with its probability of being classified as suitable for HPS (ρs Euro Surveillance (Bulletin Europeen Sur Les Maladies Transmissibles; European Communicable Disease Bulletin) 0.88). Increased risk for both diseases occurred for approximately 37% of the coverage area.

Source: Ask your librarian to help locate this item.

Resource Description

Early Warning System:

resource focus on systems used to warn populations of high temperatures, extreme weather, or other elements of climate change to prevent harm to health

A focus of content

Exposure :

weather or climate related pathway by which climate change affects health

Ecosystem Changes, Precipitation

Geographic Feature:

resource focuses on specific type of geography

None or Unspecified

Geographic Location: ☑

resource focuses on specific location

United States

Health Impact: ☑

specification of health effect or disease related to climate change exposure

Infectious Disease

Infectious Disease: Vectorborne Disease, Zoonotic Disease

Vectorborne Disease: Flea-borne Disease

Flea-borne Disease: Plague

Zoonotic Disease: Hantavirus Pulmonary Syndrome

Mitigation/Adaptation: ☑

mitigation or adaptation strategy is a focus of resource

Adaptation

Model/Methodology: ☑

type of model used or methodology development is a focus of resource

Exposure Change Prediction

Population of Concern: A focus of content

Population of Concern: ☑

populations at particular risk or vulnerability to climate change impacts

Racial/Ethnic Subgroup

Other Racial/Ethnic Subgroup: American Indians

Resource Type: ☑

format or standard characteristic of resource

Research Article

Timescale: ☑

time period studied

Short-Term (

Vulnerability/Impact Assessment: ☑

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

A focus of content